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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:

Jinichiro Kato et al.

Application No.: 10/070,740

Filed: March 12, 2002

For: Ester-forming Monomer

Group Art Unit: 1625

Examiner: Taylor V. Oh

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

RULE 132 DECLARATION

I, Dr. Jinichiro Kato, do hereby declare that I am one of the inventors of the above-identified application and that I am a citizen of Japan residing at 34 Sakurazono-cho, Nobeoka-shi, Miyazaki, Japan.

In March, 1985, I graduated from Osaka University, Graduate School of Engineering, majoring in co-enzyme chemistry, and receiving a Doctorate of Engineering from the University.

Since April, 1985, I have been an employee of Asahi Kasei Kabushiki Kaisha. While employed by Asahi Kasei in the Fibers Division (now transferred to Asahi Kasei Fibers Corporation), I have been engaged in research work in the synthesis of various synthetic resins, and the development of polyester fiber; more recently, poly(trimethylene terephthalate) fiber.

I am familiar with the history of the prosecution of this U.S. patent application and the Examiner's opinion that the claims are unpatentable under 35 U.S.C. §103 for being obvious over WO 97/49652 to Gallagher (hereafter Gallagher).

The experiments described below were performed by me or under my direct supervision and control.

A. Object of the Declaration

The object of one experiment is to show that the 1,3-propanediol recovered according to the depolymerization process of PTT (3GT) of Comparative Example F of Gallagher does not have the acrolein content or Hazen Color value of the 1,3-propanediol as specified in claim 13. An object of another experiment is to show that a PTT (3GT) polymer prepared from the recovered monomer (i.e., 1,3-propanediol) does not satisfy either the L value or the b value of the polymer as specified in claims 17 and 18.

It is noted that Comparative Example F of Gallagher refers to poly(propylene terephthalate) (PPT). However, poly(trimethylene terephthalate), PTT (in the present specification) and poly(propylene terephthalate) PPT (in Gallagher) indicate a chemically identical polyester. The polyester comprises 1,3-propanediol as the diol component, the chemical structure of which is shown in rational formula (1) below:

$HOCH_2CH_2CH_2OH$ . . . Rational formula (1)

The term "trimethylene" is derived from the number of methylene groups contained in the diol as represented by the same formula as rational formula (1). "Trimethylene" is conventionally called propylene. Accordingly, "poly(trimethylene terephthalate)" may be called poly(propylene terephthalate).

Additionally, propane diol has two isomers; (1) 1,3-propanediol and (2) 1,2-propanediol which is represented by rational formula (2).

$HOCH_2CH(OH)CH_3$ . . . Rational formula (2)

1,2-propanediol is utilized as a diol component in the synthesis of a polyester, but poly(1,2-propylene terephthalate) is clearly different from poly(1,3-propylene terephthalate) (or poly(trimethylene terephthalate) in molecular conformation and eventual polymer characteristics.

A question arises in the description of Gallagher of which of the two diols is intended to be used in the synthesis of PPT in Gallagher, 1,3-propanediol or 1,2-propane diol? However, the diol actually referred to in Gallagher is 1,3-propanediol, not 1,2-propane diol (see page 5, line 10 of Gallagher). Accordingly, it is reasonable to assume that the diol component of the PPT of Gallagher must be 1,3-propanediol.

For the reasons discussed above, it is submitted that PTT and PPT described in Gallagher are the same polyester.

B. Replication Experiments

(1) Condition of depolymerization

Comparative Example F of Gallagher is repeated following the conditions expressly given in lines 20 through 22 on page 22 and in Table 1 on page 28 (see EX 'F'). As the reaction conditions are not specifically given in the Comparative Example, the conditions described on page 11, lines 11 through 20 of Gallagher are used. More specifically, using substantially methanol as both the depolymerizer and stripping agent, a depolymerization process was carried out by feeding methanol heated at 300°C into a reaction vessel charged with a polyester where the decomposition reaction was promoted at a temperature from 220 to 250°C under a pressure of 50 psi (345 kPa).

(2) Process conditions for preparation of PTT

(3GT) polymer

Except that the 1,3-propanediol (PDO) obtained in the above replication experiment of Comparative Example F is used, the PTT polymer was prepared according to the conditions described in Example 4 of the specification using commercially available dimethyl terephthalate (DMT).

C. Results of the Experiment

(1) The results of the depolymerization process are shown in Table 1.

Table 1

Reaction ratio *1	Recovered PDO*2		Claim 13	
	Acrolein content *3	Hazen color*4	Acrolein content	Hazen color
52%	1.7 wt%	90	≤ 0.5 wt%	≤ 40

*1 Reaction ratio:

Calculated according to calculation formula described on page 13, line 25 of Gallagher.

*2 PDO = 1,3-propanediol

*3 Acrolein content:

Measured according to the method described on page 13, line 36 to page 14, line 3 of the present specification.

*4 Hazen color value:

Measured according to the method described on page 14, lines 7 through 15 of the present specification.

(2) The properties of the PTT (3GT) polymer obtained using the recovered PDO monomer are shown in Table 2

Polymer obtained using recovered PDO		EXAMPLE 4		Claims 17 & 18	
L value	b value	L value	b value	L value	b value
71	18	88	2.1	75≥	≤10

D. Conclusions

As shown in Table 1, the resultant 1,3-propanediol recovered according to the teachings of Comparative Example F of Gallagher has an acrolein content of 1.7 wt% which is greater than the value set forth in claim 13 and a Hazen color of 90 which is well above the Hazen color value set forth in claim 13.

As shown in Table 2, the PTT polymer prepared from the 1,3,-propanediol recovered according to the teachings of Comparative Example F of Gallagher has a L (brightness) value of 71 and a b (yellowing) value of 18. At these values of L and b, the PTT polymer prepared from the 1,3-propanediol recovered according to Gallagher is dull colored and poor in whiteness compared to the PTT polymer of Example 4 of the present specification where the PTT polymer had an L value of 88 and a b value of 2.1 These values, compared to those obtained according to Gallagher, are consistent with the values of L and b set forth in claims 17 and 18. See page 13, lines 20-29 of the present specification regarding the significance of L and b values.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements

and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Date: March 12, 2004

SHINICHIRO KATO

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